

REMARKS

Claims 1-20 are currently pending, of which claims 1-14 are under examination.
Claims 15-20 are withdrawn.

In the Final Office Action identified above,¹ the Examiner:

- a) rejected claims 1-4 and 10-12 under 35 U.S.C. § 103(a) as being unpatentable over Tanaka (U.S. Patent No. 6,906,374) in view of Matsuoka et al. (U.S. Patent No. 6,809,364, hereinafter "Matsuoka");
- b) rejected claims 6-9 under 35 U.S.C. § 103(a) as being unpatentable over Tanaka in view of Matsuoka and further in view of Nguyen et al. (U.S. Publication No. 2004/0092095, hereinafter "Nguyen"); and
- c) objected to claims 5, 13, and 14 as being dependent upon a rejected base claim, but stated that these claims would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims.

By the present Amendment, Applicant has amended independent claim 1 for further clarity.

Applicant respectfully traverses the rejection of claims 1-4 and 10-12 under 35 U.S.C. § 103(a) as being unpatentable over Tanaka in view of Matsuoka, because a *prima facie* case of obviousness has not been established.

To establish a *prima facie* case of obviousness, the prior art reference (separately or in combination) must teach or suggest all the claim limitations. See

¹ The Final Office Action may contain statements characterizing the related art, case law, and claims. Regardless of whether any such statements are specifically identified herein, Applicant declines to automatically subscribe to any statements in the Final Office Action.

M.P.E.P. § 2142, 8th Ed., Rev. 5 (August 2006). “[I]n formulating a rejection under 35 U.S.C. § 103(a) based upon a combination of prior art elements, it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed.” *USPTO Memorandum* from Margaret A. Focarino, Deputy Commissioner for Patent Operations, May 3, 2007, p. 2. “[T]he analysis supporting a rejection ... should be made explicit” and it is “important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements in the manner claimed.” *Id.* (citing *KSR Int’l Co. v. Teleflex, Inc.*, No. 04-1350 (U.S. Apr. 30, 2007)).

Here, a *prima facie* case of obviousness has not been established because, among other things, Tanaka and Matsuoka, taken alone or in combination, fail to teach or suggest each and every element recited in independent claim 1. In particular, the cited references fail to teach or suggest at least the claimed semiconductor device including “a guard ring buried in said second insulating film, the guard ring surrounding a single said MIM capacitor and penetrating said second insulating film from its top to its bottom,” as recited in claim 1.

According to the present invention, as shown in Fig. 2 of the specification for example, a guard ring 9 buried in an second interlayer insulating film 6 surrounds an MIM capacitor 5 and penetrates the second interlayer insulating film 6 from top to bottom.² The guard ring 9 can thus prevent a short-circuit between the MIM capacitor 5

² In making the various references to the specification and drawings set forth herein, it is to be understood that Applicant is in no way intending to limit the scope of the claims to the exemplary embodiments shown in the drawings and described in the specification. Rather, Applicant expressly affirms that Applicant is entitled to have the claims interpreted broadly, to the maximum extent permitted by statute, regulations and applicable case law.

and the second wiring 7 which may occur due to cracks formed in the second interlayer insulating film.

In contrast, Fig. 34 of Tanaka shows a device which includes a capacitor, comprising a capacitor lower electrode 54, an insulation film 56, and a capacitor upper electrode 58. The device of Tanaka also includes a guard ring, which is the rightmost capacitor lower electrode 54 (See Tanaka, col. 11, lines 34-37), and an interlayer insulation film 48 formed on the right side of the guard ring 54 and in contact with the guard ring 54. The device of Tanaka does not include a second wiring, as admitted by the Examiner. See Final Office Action at page 3.

The Examiner apparently contends that the interlayer insulation film 48 of Tanaka constitutes the “second insulating film” of claim 1, alleging “a second insulating film 48 formed to cover the sides of the upper metal electrode 58 of the MIM capacitor.” See Final Office Action at page 2. However, as shown in Fig. 34, the guard ring (the rightmost lower electrode 54) is not buried in the interlayer insulation film 48, and does not penetrate the interlayer insulation film 48 from its top to its bottom. As shown in Fig. 34 of Tanaka, the device of Tanaka does not include a second wiring, and since the guard ring is not buried in the interlayer insulation film 48 and does not penetrate the interlayer insulation film 48 from top to bottom, the guard ring cannot prevent a short-circuiting between the MIM capacitor and a second wiring that may occur due to cracks formed in the interlayer insulation film 48.

For at least the above reason, the guard ring of Tanaka cannot constitute the claimed “guard ring buried in said second insulating film [which penetrates] said second insulating film from its top to its bottom.” Tanaka thus fails to teach or suggest at least

“a guard ring buried in said second insulating film,” and “the guard ring penetrating said second insulating film from its top to its bottom,” as recited in claim 1.

Moreover, Tanaka additionally fails to teach or suggest a guard ring “surrounding a single said MIM capacitor,” as recited in claim 1. Fig. 5 shows a guard ring 15 extending along the boundary between the capacitor region (including many capacitors) and the peripheral region to cut across the regions. See Tanaka, col. 8, lines 19-22. Further, regarding Fig. 34, it is described that “[t]he metal film located at the boundary between the DRAM memory cell region and the DRAM peripheral circuit region is a guard ring.” Tanaka, col. 11, lines 34-36. Therefore, contrary to the Examiner’s allegation that “the leftmost and the rightmost 54 shown in Fig. 34 of Tanaka ... are a guard ring which surrounds ‘a capacitor lower electrode 54’ (column 11, lines 30-34)” (See Final Office Action at page 5), only the rightmost 54 in Fig. 34 is a guard ring, since it is located at the boundary between the DRAM cell region and DRAM peripheral circuit region. The leftmost 54, which is partially shown in Fig. 34, is clearly located inside the DRAM cell region and, thus, is not a guard ring. The guard ring, shown only by the rightmost 54, is located at the boundary between the DRAM cell region (which include a plurality of capacitors including the two lower capacitor electrodes 54 shown to the left of the guard ring) and the DRAM peripheral circuit region. Thus, Tanaka fails to teach or suggest a guard ring “surrounding a single said MIM capacitor,” as recited in claim 1.

Matsuoka fails to overcome the shortcomings of Tanaka, because Matsuoka also does not teach or suggest the claimed “guard ring buried in said second insulating film, the guard ring surrounding a single said MIM capacitor and penetrating said second

insulating film from its top to its bottom,” as recited in claim 1. The Examiner applied Matsuoka to teach that “a capacitor 23 having an upper electrode 24 is covered by a second insulating film 905/906” and “a second wiring 26 formed on the second insulating film 905/906.” See Final Office Action at page 3. However, even assuming that Matsuoka provides these teachings, Matsuoka is entirely silent regarding a guard ring, and thus fails to teach or suggest the claimed “guard ring buried in said second insulating film, the guard ring surrounding a single said MIM capacitor and penetrating said second insulating film from its top to its bottom,” as recited in claim 1.

For at least the reason that Tanaka and Matsuoka, taken alone or in combination, fail to teach or suggest each and every element recited in independent claim 1, no *prima facie* case of obviousness has been established. Accordingly, claim 1 is allowable over Tanaka and Matsuoka, and claims 2-4 and 10-12 are also allowable over these references at least due to their dependence. The rejection of claims 1-4 and 10-12 under 35 U.S.C. § 103(a) should be withdrawn.

Applicant respectfully traverses the rejection of claims 6-9 under 35 U.S.C. § 103(a) as being unpatentable over Tanaka in view of Matsuoka and further in view of Nguyen. A *prima facie* case of obviousness has not been established because, among other things, the cited references, taken individually or in combination, fails to teach or suggest each and every element recited in claim 1 and required by dependent claims 6-9.

Applicant has already established above regarding claim 1 that Tanaka and Matsuoka fail to teach at least the claimed “guard ring buried in said second insulating film, the guard ring surrounding a single said MIM capacitor and penetrating said

second insulating film from its top to its bottom,” as recited in claim 1. Nguyen fails to overcome the shortcomings of Tanaka and Matsuoka. The Examiner relies on Nguyen for teaching “forming of an insulating film 104 surrounding an interconnect and made of materials including fluorine containing silicon oxide (FSG), carbon containing silicon oxide (SiOC), or porous silicon oxide (par. [0023]).” See Final Office Action at page 4. However, even if these teachings are present in Nguyen, Nguyen does not teach a guard ring and thus fails to teach or suggest the claimed “guard ring buried in said second insulating film, the guard ring surrounding a single said MIM capacitor and penetrating said second insulating film from its top to its bottom,” as recited in claim 1 and required by dependent claims 6-9. Therefore, claims 6-9 are allowable over the Examiner’s proposed combination of Tanaka, Matsuoka, and Nguyen. The rejection of claims 6-9 under 35 U.S.C. § 103(a) should be withdrawn.

Although Applicant respectfully traverses the objection to claims 5, 13, and 14, the objection should be withdrawn at least for the reasons discussed above.


In view of the foregoing, Applicant respectfully requests reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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